

What is Claimed Is:

1. An apparatus for vapor depositing a uniform thickness thin film of a lubricant on at least one surface of a disk-shaped substrate, comprising:

- (a) a chamber having an interior space;
- (b) a substrate loader/unloader for supplying said interior space with at least one disk-shaped substrate and for withdrawing at least one disk-shaped substrate from said interior space, said disk-shaped substrate comprising a magnetic or magneto optical data/information storage and retrieval medium;
- (c) at least one lubricant vapor source for supplying said interior space with a stream of lubricant vapor, said vapor source comprising a closed heated chamber fluidly communicating with at least a plurality of primary plugs for supplying a stream of lubricant vapor; and
- (d) a substrate transporter/conveyor for continuously moving at least one disk-shaped substrate past said stream of lubricant vapor from said at least one lubricant vapor source for depositing on at least one surface thereof a uniform thickness thin film of lubricant.

2. The apparatus according to claim 1, wherein said chamber (a) is adapted for maintaining said interior space at a pressure below atmospheric pressure.

3. The apparatus according to claim 1, wherein said substrate loader/unloader (b) is adapted for providing cooling/condensation of said lubricant vapor for preventing escape of said lubricant vapor from said interior space of said chamber.

4. The apparatus according to claim 1, wherein said substrate loader/unloader (b) is adapted for supplying and withdrawing at least one disc-shaped substrate having a pair of opposed surfaces and said substrate transporter/conveyor (d) is adapted for mounting or gripping at least one disc-shaped substrate.

5. The apparatus according to claim 4, wherein said at least one lubricant vapor source (c) is elongated, with a length greater than an outer diameter of said disc-shaped substrate.

6. The apparatus according to claim 5, wherein said elongated lubricant vapor source (c) comprises a closed heated chamber for accommodating liquid lubricant therein and serving as a lubricant vaporizer, said closed heated chamber fluidly communicating with at least a plurality of primary plugs for supplying said stream of lubricant vapor.

7. The apparatus according to claim 6, wherein said elongated vapor source (c) further comprises a plurality of secondary plugs for increased collimation of said stream of lubricant vapor.

8. The apparatus according to claim 6, further comprising a spaced-apart plurality of said elongated lubricant vapor sources (c) arranged along a path of transport/conveyance of said at least one disc-shaped substrate within said interior space of said chamber.

9. The apparatus according to claim 1, wherein said lubricant vapor source (c) comprises at least a plurality of threaded holes into which said plugs are screwed therein.

10. The apparatus according to claim 9, wherein each of said plugs comprises a drilled hole, said drilled hole substantially extending the length of the plug's interior.

11. The apparatus according to claim 10, wherein the drilled hole of each plug can have substantially the same or different diameter from one another.

12. The apparatus according to claim 10, wherein the plugs form a pattern in the form of a linear array, a diagonal array, or a rectangular array.

13. The apparatus according to claim 8, wherein said chamber (a) is cylindrically-shaped with circularly-shaped upper and lower ends; said substrate loader/unloader (b) comprises at least one combined substrate load/unload station on one of said upper and lower ends; said spaced-apart plurality of lubricant vapor sources (c) comprises a first plurality of radially extending, elongated lubricant vapor sources for depositing a thin film of lubricant on a first one of said pair of opposed surfaces of said disc-shaped substrate; and said substrate transporter/conveyor (d) is adapted to move said at least one disc-shaped substrate in a circular path past each of said first plurality of radially extending, elongated lubricant vapor sources.

14. The apparatus according to claim 13, wherein said spaced-apart plurality of lubricant vapor sources (c) comprises a second plurality of radially extending, elongated lubricant vapor sources for depositing a thin film of lubricant on a second one of said pair of opposed surfaces of said disc-shaped substrate.

15. The apparatus according to claim 8, wherein said chamber (a) is an elongated, rectangular box-shaped chamber having a pair of longitudinally extending front and rear walls; said substrate loader/unloader (b) comprises a substrate load lock chamber connected to said chamber at a first end of said front wall and a substrate exit lock chamber connected to said chamber at a second end of said front wall; each of said spaced-apart plurality of elongated lubricant vapor sources (c) extends transversely across said front wall in the space between said load lock and said exit chambers; and said substrate transporter/conveyor (d) is adapted to move said at least one disc-shaped substrate in a linear path past each of the transversely extending, elongated lubricant vapor sources.

16. A method of vapor depositing a uniform thickness thin film of lubricant on at least one surface of a disk-shaped substrate, comprising the steps of:

- (a) providing an apparatus comprising:
  - (i) a chamber having an interior space maintained below atmospheric pressure;
  - (ii) a substrate loader/unloader for supplying said interior space with at least one disk-shaped substrate and for withdrawing at least one disk-shaped substrate from said interior space, said disk-shaped substrate comprising a magnetic or magneto optical data/information storage and retrieval medium;
  - (iii) at least one lubricant vapor source for supplying said interior space with a stream of lubricant vapor, said vapor source comprising a closed heated chamber fluidly communicating with at least a plurality of primary plugs for supplying a stream of lubricant vapor; and
  - (iv) a substrate transporter/conveyor for continuously moving at least one substrate past said stream of vapor from said at least one lubricant vapor source;
- (b) supplying said interior space with a substrate having at least one surface;
- (c) continuously moving said substrate past said stream of lubricant vapor and depositing a uniform thickness thin film of said lubricant on said at least one surface; and
- (d) withdrawing the lubricant-coated disk-shaped substrate from said interior space.

17. The method as in claim 16, wherein:  
 step (b) comprises supplying a disc-shaped substrate having a pair of opposed surfaces.

18. The method as in claim 17, wherein:  
 step (b) comprises supplying a disc-shaped substrate having a laminate of layers for a magnetic or magneto-optical (MO) data/information storage and retrieval medium formed on at least one of said pair of opposed surfaces.

19. The method as in claim 18, wherein:

step (c) comprises vapor depositing a thin film of a polymeric fluorine-containing lubricant on said laminate of layers on at least one of said pair of opposed surfaces.

20. The method as in claim 17, wherein:

step (a)(iii) comprises providing an apparatus with at least one elongated lubricant vapor source having a length greater than an outer diameter of said disc-shaped substrate, said at least one elongated lubricant vapor source comprising a closed heated chamber for accommodating liquid lubricant therein and serving as a lubricant vaporizer, said closed heated chamber fluidly communicating with a plurality of primary plugs for supplying said stream of lubricant vapor.

21. The method as in claim 20, wherein:

step (a) comprises providing an apparatus wherein said chamber (i) is in the form of a cylinder with circularly-shaped upper and lower ends; said substrate loader/unloader (ii) comprises at least one combined substrate load/unload station on one of said upper and lower ends; said at least one elongated lubricant vapor source (iii) comprises a first plurality of spaced-apart, radially extending, elongated lubricant vapor sources for depositing a thin film of lubricant on a first one of said pair of opposed surfaces of said disc-shaped substrate; and said substrate transporter/conveyor (iv) is adapted to move said at least one disc-shaped substrate in a circular path past each of said first plurality of spaced-apart, radially extending, elongated lubricant vapor sources.

22. The method as in claim 21, wherein said at least one elongated lubricant vapor source (iii) further comprises a second plurality of spaced-apart, radially extending, elongated lubricant vapor sources for depositing a thin film of lubricant on a second one of said pair of opposed surfaces of said disc-shaped substrate.

23. The method as in claim 20, wherein step (a) comprises providing an apparatus wherein said chamber (i) is in the form of an elongated, rectangularly-shaped box having a pair of longitudinally extending front and rear walls; said substrate loader/unloader (ii) comprises a substrate load lock chamber connected to said chamber at a first end of said front wall and a substrate exit lock chamber connected to said chamber at a second end of said front wall; said at least one elongated lubricant vapor source (iii) comprises a plurality of spaced-apart, elongated lubricant vapor sources transversely extending across said front wall in the space between said load lock and said exit chambers; and said substrate transporter/conveyor (iv) is adapted to move said at least one disc-shaped substrate in a linear path past each of the plurality of spaced-apart, transversely extending, elongated lubricant vapor sources.

24. The apparatus according to claim 16, wherein step (a)(iii) comprises providing an apparatus with at least one elongated lubricant vapor source comprising at least a plurality of threaded holes into which said plugs are screwed therein.

25. The apparatus according to claim 24, wherein each of said plugs comprises a drilled hole, said drilled hole substantially extending the length of the plug's interior.

26. The apparatus according to claim 25, wherein the drilled hole of each plug can have substantially the same or different diameter from one another.

27. The apparatus according to claim 24, wherein the plugs form a pattern in the form of a linear array, a diagonal array, or a rectangular array.